

## **ABSTRACT OF THE DISCLOSURE**

The invention relates to a high-frequency plasma beam source with a plasma chamber for a plasma, electrical means for applying an electrical voltage to the high-frequency plasma beam source to ignite and maintain the plasma, extraction means for extracting a plasma beam (I) from the plasma chamber as well as an exit opening, which is separated from the vacuum chamber by an extraction grid. The plasma beam (I) exits with a substantially divergent radiation characteristic from the high-frequency plasma beam source. The invention furthermore relates to a method for the irradiation of a surface with a plasma beam (I) of a high-frequency plasma beam source, the plasma beam (I) being divergent.